

## **Quarterly Progress Report (Field Office Project Template)**

**Project Title:** Development of an Integrated Solar Heat Pipe System for Improving Building Energy Efficiency

**Award Number:** [Official Award Number per the agreement]

**Recipient:**

**Project Location:** [Location of project activities; if multiple locations, please list all in use.]Belknap Research Building

**Reporting Period:** [e.g., January 1, 2006 to March 31, 2006] 1 October 2007 – 31 December 2007

**Date of Report:** [e.g., April 30, 2006] 10 January 2008

**Written by:** [Name] E. G. Brehob

**IMPORTANT NOTE:** If any part of your quarterly report contains **proprietary/confidential information**, or details that should not be released to the general public, the specific sections of the report should be marked as such, by clearly marking the beginning and end of the confidential information. The marked sections will not be released to the general public or any unauthorized parties.

**Status:** [In this section each task, as defined by the Project Management Plan (PMP), should be discussed by following the outline given below. The discussion for each task should include subtasks. Milestones, deliverables, and go/no go decision points covered in Table C of the accompanying excel quarterly report and the PMP may be discussed in more detail in this section; however, please ensure Table C is completely and accurately filled in.]

**Task number:** [(e.g., A)]

1. **Planned Activities:** [This section should include the planned activities that were stated in the previous quarterly report for the task being discussed, including subtasks, milestones, deliverables, and go/no go decision points.]

**Planned deliverables:**

**Task 1: Computer simulation of system performance and parametric study** – The computer simulations of parameter variations have been completed (finished in last progress report).

**Task 2: Economic assessment of parameter variations** – Preliminary economic assessment of design options have been assessed using the computer simulation and development of solid models to calculate material requirements.

**Task 3: Develop design concepts for appearance, manufacturability, shipping, installation and service** – Report containing recommendations, sketches, notes and drawings of initial product design is complete (finished in last progress report).

**Task 4: Heat pipe efficiency improvement experiments** – Complete all physical experiments.

2. **Actual Accomplishments:** [The discussion should include all significant work completed in the past quarter to support the project and accomplish the specific task being discussed, including subtasks, milestones, deliverables, or go/no go decision points. When a task-level milestone has been completed, please include a brief explanation of how completion of the task achieves/supports/further completion of the C-level milestone as indicated in the PMP (cell X48). Actual work completed should conform to the “Planned Activities” described in the above section. If it does not, an explanation of the variance is required and should be discussed below in section 3. **Explanation of Variances.**]

**Task 1: Computer simulation of system performance and parametric study** –Program development is complete and runs have been performed for a range of design configurations. The complete set of data in graphical form showing the trends for parameter variations has been prepared and was summarized at the last KREC meeting. In addition, the computer simulation has been altered to mimic laboratory conditions and the program will be run to match the performance of the experiment. This effort is on-going and requires an iterative procedure to vary the thermal resistance elements used in the simulation to match the experiment.

**Task 2: Economic assessment of parameter variations** –Tasks 2 and 3 are related. Solid models of the solar heat pipe wall for new construction and for retrofit into existing buildings have been developed. The details of the solid models allow more refined calculation of the materials required and better cost estimates to be made.

**Task 3: Develop design concepts for appearance, manufacturability, shipping, installation and service** – The solid models of solar heat pipe wall were developed in Solid Edge and provide more detail on the construction of the system. The solid models provide convenient calculation of the amount of material and weight, and are used in assessing manufacturability, shipping, and installation.

**Task 4: Heat pipe efficiency improvement experiments** –During the recent quarter the bulk of the time was spent running experiments. The experiments take several hours to run and a period of cool down time is also required. Three runs for each test condition have been done to address repeatability. Trials of various heat pipe fill levels (80%, 100%, and 120%), and an insulated and uninsulated adiabatic section have been run.

3. **Explanation of Variance:** [This section should discuss any differences between the planned activities (section 1) and the actual accomplishments (section 2). These differences should be included even if the setback was out of the control of the recipient, such as a change in the availability of equipment and/or facilities. Issues, concerns, successes or requested changes and the resulting impact to the Statement of Project Objectives, budget and/or schedule should be discussed. If progress (Section C, column V of the accompanying excel file) is Y or R, please explain the corrective actions that will be taken to mitigate scope, schedule, and budget changes or shortfalls.]

**Task 1: Computer simulation of system performance and parametric study** – The simulations and parametric study are completed (as mentioned). The simulation of the experiment, which is beyond the scope of the project plan, has been initiated and will proceed as experimental results are available.

**Task 2: Economic assessment of parameter variations** – No variances.

**Task 3: Develop design concepts for appearance, manufacturability, shipping, installation and service** – No variances.

**Task 4: Heat pipe efficiency improvement experiments** – The experiments are not completed. One issue was that after several runs, the heat pipe began to leak. It required tearing down the system, searching for and repairing the leak. Another issue is that more experiments with fill level have been required (to see a decrease in performance with increasing fill level and, thus, locate the best fill level).

4. **Plans for Next Quarter:** [Planned activities for this task, to be conducted during the next quarter should be discussed here.]

**[REPEAT these discussions for each task in the Project Management Plan (e.g. A, B, C, etc...)]**

**Task 1: Computer simulation of system performance and parametric study** –The simulations are complete. A modification to the computer simulation is being made to use the simulation to model the experiment.

**Task 2: Economic assessment of parameter variations** – The economic assessment tool is complete and can be used to assess alternate designs.

**Task 3: Develop design concepts for appearance, manufacturability, shipping, installation and service** –This task is complete. While design concepts have been generated, a final design has not been selected.

**Task 4: Heat pipe efficiency improvement experiments** – The experiments yet to be run include a test of 140% fill level for the heat pipe and tests with the finned condenser section.

**Patents:** [A **cumulative** list of patents applied for or resulting from the award, including date of application and receipt of patent(s) and date and status of DOE notification.]

none

**Publications / Presentations:** [Identify and briefly summarize, in a few sentences, all publications and presentations made for industry or government groups resulting from the project during this quarter and, if possible, include a URL link or other method of accessing the publication or presentation. In addition, please upload the electronic file to the PMC if required (see your “Federal Assistance Reporting Checklist,” form 4600.2, for required uploads).]

Albanese M, Boulware C, Brehob E & Sharp MK, “Passive Solar Heating Strategies for Kentucky’s Moderately Cold and Moderately Sunny Climate,” *Sustain* 15:22-30,2007, 2006.